Patent
Docket No: 55347US003

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Group Art Unit: 1714

Ashish K. Khandpur, Jingjing Ma, Mark D. Gehlsen, Bradley S. Momchilovich, and John J. Stradinger

Serial No.: 09/496,831
Filed: February 2, 2000 Examiner: P. Szekely

For: Adhesive for Bonding to Low Surface Energy Surfaces

CERTIFICATE OF FACSIMILE TRANSMISSION UNDER 37 C.F.R. 1.8: I hereby certify that this correspondence is being sent by facsimile to the telephone number shown below, addressed to the Commissioner for Patents, Washington, D.C. 20231, on the below indicated date:

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Date: January 28 2005 By Lynelle K Grube
Lynelle K. Grube

FURTHER DECLARATION UNDER 37 C.F.R. §132 OF ASHISH KHANDPUR

Commissioner for Patents
Washington, DC 20231
Box AF

JAL

I, Ashish Khandpur, hereby declare that:

1. I am the same Ashish Khandpur who is identified as a co-inventor in the above-identified application ("our application") and as the Declarant in the Declaration Under 37 C.F.R. §132 of Ashish Khandpur filed August 8, 2002 ("First Declaration").

2. The First Declaration should be updated to state that I am an inventor or co-inventor of 4 issued U. S. patents, 1 allowed U.S. application and 4 other pending U.S. patent applications involving adhesives and adhesive products.

3. I have read the Office Action mailed August 30, 2002 ("Office Action") and the cited references including newly cited U.S. Patent No. 5,777,039 (De Craene et al. '039).

4. Nestegard et al. '787 does not describe or teach pressure sensitive adhesives that form a high-strength bond on low surface energy substrates. Nestegard et al. '787 actually describes tapes that "maintain moderate adhesion, thereby being easy to remove" (col. 9, lines 47-48). Nestegard et al. '787 also says that its adhesive "is especially useful for making removable tapes, such as masking tapes" (col. 9, lines 54-55). The moderate adhesion values provided by Nestegard et al. '787 can be better appreciated by reviewing Nestegard et al. '787 Table 3. Table 3 reports adhesion results for ten adhesive formulations made from five uncrosslinked or crosslinked block copolymers. The "ADH" columns in Table 3 show 180° peel adhesion results on a stainless steel substrate measured according to standard tape method PSTC-1, Peel Adhesion for Single Coated Tapes 180° Angle. The reported adhesion values ranged from 280 to 770 N/m (28 to 77 N/dm). The adhesives of our invention form high-strength bonds on high surface energy (e.g., glass or metal) and low surface energy (e.g., high-density polyethylene) substrates, and provide substantially higher 180° peel adhesion on stainless steel substrates than was reported by Nestegard et al. '787. Our adhesives could be described as semi-permanent adhesives which are difficult to remove or debond. To further compare our invention to Nestegard et al. '787, I asked Mr. John J. Stradinger to determine the 180° peel adhesion to stainless steel of the adhesives of our Examples 25 -29, using standard tape method PSTC-1 and 5 mil thick adhesive films. Mr. Stradinger obtained adhesion values of 1514, 2065, 1860, 1753 and 1750 N/m (151.4, 206.5, 186.0, 175.3 and 175.0 N/dm), respectively, with clean peel behavior being exhibited in each instance. Mr. Stradinger also evaluated adhesives made using uncrosslinked versions of the copolymers of Examples 25 and 28, and obtained respective adhesion values of 1943 and 2063 M/m (194.3 and 206.3 N/dm), with clean peel behavior again being obtained. This demonstrates that adhesives of our invention can provide much higher 180° peel adhesion to stainless steel than was shown in Nestegard et al. '787, and demonstrates that our invention exhibits unexpected results not shown in Nestegard et al. '787..

5. The Office Action says that Nestegard et al. '787 reveals "tackifier concentrations of 25-400 pbw" and that "applicants have to prove that the adhesive having the highest glass transition temperature obtainable within the above concentration limitations is below 245°K." As I understand it, we do not have to show that "the adhesive having the

highest glass transition temperature obtainable within the above concentration limitations is below 245°K", but instead could show that compositions containing these tackifier amounts do not fall within our claims.

6. Nestegard et al. '787 does not exemplify specific adhesives containing 25 or 400 pbw tackifier. Depending on the chosen copolymer and chosen tackifier, the Fox Tg of a tackified adhesive will vary. The showing requested in the Office Action thus requires selection of both a copolymer and a tackifier. For purposes of addressing the Office Action's request I made such selections, but I do not concede that they are actually taught in Nestegard et al. '787.

7. In order to address the Office Action's request, I calculated the rubber phase Fox Tg of six proposed compositions made from a mixture of 100 pbw of Polymer A, Polymer B or Polymer C (this being the amount and types of asymmetric block copolymers used in Example 2 of Nestegard et al. '787 with a polyisoprene Tg of 213°K as mentioned in col. 9, line 53 of Nestegard et al. '506), 25 pbw or 400 pbw of WINGTACK™ PLUS tackifier (this being the amounts of tackifier mentioned in the Office Action and the type of tackifier used in Example 2 of Nestegard et al. '787 and having a Tg of 315°K) and 30 pbw ZONAREZ™ A-25 plasticizer (this being the amount and type of plasticizer used in Example 2 of Nestegard et al. '787 with a Tg of 253°K as mentioned in col. 9, lines 54-55 of Nestegard et al. '506). The proposed compositions containing 25 pbw WINGTACK PLUS tackifier had calculated rubber phase Fox Tg values of 233.1°K, 233.1°K and 233.4°K, respectively for compositions based on Polymer A, Polymer B and Polymer C. These rubber phase Fox Tg values are not greater than 245°K. The proposed compositions containing 25 pbw WINGTACK PLUS tackifier do not anticipate our claims.

8. The proposed compositions containing 400 pbw instead of 25 pbw WINGTACK PLUS tackifier had calculated rubber phase Fox Tg values of 286.4°K, 286.4°K and 286.8°K, respectively for compositions based on Polymer A, Polymer B and Polymer C. These rubber phase Fox Tg values would be greater than 245°K. However, these proposed compositions would not provide a "pressure sensitive adhesive" and would not exhibit "a 180° peel adhesion on high density polyethylene of at least 80 N/dm" as recited in our claim 1. I established this as follows. Dr. Ma's samples of Polymer A, Polymer B and Polymer C had been used up or discarded, so I requested preparation of a test composition using the Base Copolymer (described

in the First Declaration), tackifier and plasticizer. As explained in the Declaration Under 37 C.F.R. §132 of Jingjing Ma filed August 8, 2002 (the "Ma Declaration"), the Base Copolymer was prepared like Polymer B of Nestegard et al. '787, with somewhat higher molecular weight endblocks and an otherwise generally similar molecular structure. As also explained in the Ma Declaration, the Base Copolymer should provide adhesion to a low surface energy surface that would be comparable (at equivalent tackifier levels) to the adhesion that might be provided by an adhesive containing Polymer A, Polymer B or Polymer C. At my request Mr. Stradinger mixed 100 pbw of the Base Copolymer with 400 pbw WINGTACK PLUS tackifier and 30 pbw ZONAREZ A-25 plasticizer in toluene to provide a 35% solids solution. Also at my request (and using substantially the procedures described in our application at page 17, lines 16-31 and page 22, line 21 through page 23, line 3), Mr. Stradinger coated a layer of the resulting composition on a 35 μm (1.4 mil) thick polyethylene terephthalate backing to make an adhesive tape having a 127 μm (5 mil) thick dried adhesive film. Mr. Stradinger evaluated adhesive properties of both uncrosslinked samples of the film and samples that had been crosslinked using e-beam radiation at 150 kV and a dose of 5 Mrad as in col. 3, lines 30-35 of Nestegard et al. '787. **Neither film was pressure sensitive and neither film adhered to high density polyethylene**. Accordingly when evaluated using the 180° Peel Adhesion test set out at page 17, lines 16- 31 of our application, neither film had "a 180° peel adhesion of at least 80 N/dm" as recited in claim 1 of our application. I conclude from these results that the proposed compositions containing 400 pbw WINGTACK PLUS tackifier do not anticipate our claims.

9. Nestegard et al. '506 describes pressure sensitive adhesives made by combining various symmetric or asymmetric elastomeric block copolymers with "at least one tackifier or oil that is compatible with the low molecular weight endblock segment of the block copolymer". Our application describes pressure sensitive adhesives for low surface energy surfaces, made by combining a polymodal asymmetric elastomeric block copolymer with "at least one midblock-compatible tackifier in an amount sufficient to raise the calculated Fox Tg of the rubber phase of said adhesive to greater than 245°K". These adhesives are not the same. Nestegard et al. '506 recommends using tackifiers that will mix with the aromatic endblock of a symmetric or asymmetric elastomeric block copolymer, whereas our application recommends

using tackifiers that will mix with the rubbery midblock of an asymmetric elastomeric block copolymer. Moreover, Nestegard et al. '506 recommends using tackifiers that will lower the Tg of the endblock (see, e.g., col. 4, lines 5-7) whereas our application recommends using tackifiers that will raise the Tg of the midblock.

10. The Office Action says that Nestegard et al. '506 reveals "tackifier concentrations of 50-200 pbw" and that "applicants have to prove that the adhesive having the highest glass transition temperature obtainable within the above concentration limitations is below 245°K." As I understand it, applicants do not have to show that "the adhesive having the highest glass transition temperature obtainable within the above concentration limitations is below 245°K", but instead merely could show that compositions containing these tackifier amounts do not fall within our claims.

11. Nestegard et al. '506 does not exemplify specific adhesives containing 50 or 200 pbw tackifier. As mentioned above, the Fox Tg of a tackified adhesive will vary depending on the chosen copolymer and chosen tackifier. The showing requested in the Office Action with respect to Nestegard et al. '506 thus requires selection of both a copolymer and a tackifier. For purposes of addressing the Office Action's request I made such selections, but I do not concede that they are actually taught in Nestegard et al. '506.

12. Nestegard et al. '506 exemplifies six block copolymers, only one of which (Polymer F) is asymmetric. As shown in Table 6 of Nestegard et al. '506, Polymer F was made into Adhesive 11 and Adhesive 12. Adhesive 11 is a comparative example whose calculated Fox Tg is discussed in the First Declaration. Adhesive 12 is a "Sample of the invention" of Nestegard et al. '506 containing 100 pbw Polymer F, 46.2 pbw ESCOREZ™ 2393 tackifier and 53.8 pbw PICCOVAR™ A-25 plasticizer.

13. In order to address the Office Action's request, I calculated the rubber phase Fox Tg of two proposed compositions made from a mixture of 100 pbw Polymer F (this being the amount and type of asymmetric block copolymer used in Example 12 of Nestegard et al. '506), 50 or 200 pbw ESCOREZ 2393 tackifier (this being the amounts of tackifier mentioned in the Office Action and the type of tackifier used in Example 12 of Nestegard et al. '506 with a Tg of 318°K as mentioned in col. 9, lines 54-55) and 53.8 pbw PICCOVAR A-25 plasticizer (this being the amount and type of plasticizer used in Example 12 of Nestegard et al. '506

with a Tg of 253°K as mentioned in col. 9, lines 54-55). The proposed composition containing 50 pbw ESCOREZ 2393 tackifier had a calculated rubber phase Fox Tg value of 244.3°K. This rubber phase Fox Tg value is not greater than 245°K. The proposed composition containing 50 pbw ESCOREZ 2393 tackifier does not anticipate our claims.

14. The proposed composition containing 200 pbw instead of 50 pbw ESCOREZ 2393 tackifier had a calculated rubber phase Fox Tg value of 271.7°K. This rubber phase Fox Tg value would be greater than 245°K. However, this proposed composition would not exhibit "a 180° peel adhesion on high density polyethylene of at least 80 N/dm" as recited in our claim 1. I established this as follows. I requested preparation of an actual test composition using Substitute Polymer F (described in the First Declaration), tackifier and plasticizer. As explained in the Ma Declaration, Substitute Polymer F is substantially similar to Polymer F. It was used in place of Polymer F because Dr. Ma's supply of Polymer F had been used up or discarded. At my request, Mr. Stradinger formulated an adhesive by mixing 100 pbw of Substitute Polymer F with 200 pbw ESCOREZ 2393 tackifier and 53.8 pbw PICCOVAR AP-25 plasticizer in toluene to provide a 35% solids solution. Also at my request (and using substantially the procedures described in our application at page 17, lines 16-31 and page 22, line 21 through page 23, line 3), Mr. Stradinger coated a layer of the resulting composition on a 35 μm (1.4 mil) thick polyethylene terephthalate backing to make an adhesive tape having a 127 μm (5 mil) thick dried adhesive film. Mr. Stradinger evaluated adhesive properties of both uncrosslinked samples of the film and samples that had been crosslinked using e-beam radiation at 150 kV and a dose of 5 Mrad as in col. 3, lines 30-35 of Nestegard et al. '787. This dosage from Nestegard et al. '787 was employed because Nestegard et al. '506 does not discuss specific e-beam conditions. Both films could be adhered to high density polyethylene but exhibited "shocky" peel release properties (in other words, intermittent, varying release behavior rather than smooth peel behavior) that would usually be undesirable in a pressure sensitive adhesive. The average measured results when evaluated using the 180° Peel Adhesion test set out at page 17, lines 16- 31 of our application were 66.1 N/dm for the uncrosslinked adhesive and 26.7 N/dm for the crosslinked adhesive but as noted above both films were shocky. I also asked Mr. Stradinger to repeat this evaluation while omitting the PICCOVAR AP-25 plasticizer from each film. The measured results were 71.3 N/dm for the

uncrosslinked adhesive and 15.5 N/dm for the crosslinked adhesive and again both films were shocky. Accordingly when evaluated using the 180° Peel Adhesion test set out at page 17, lines 16- 31 of our application, these comparison films did not have "a 180° peel adhesion of at least 80 N/dm" as recited in claim 1 of our application. I conclude from this result that the proposed composition containing 200 pbw ESCOREZ 2393 tackifier does not anticipate our claims.

15. De Craene et al. '039 describes radial multiarmed block copolymers and adhesives made from such copolymers. These copolymers are said to be "asymmetrical radial polymers" (see, e.g., col. 4, lines 19-20). They contain a mixture of AB arms and B^1 arms where A is a poly(vinyl aromatic) block and B and B^1 are the same or different poly(butadiene) blocks (see e.g., col. 2, line 66 through col. 3, line 4). In such copolymers the poly(vinyl aromatic) block A is the same for each arm containing a vinyl group, but asymmetry arises because some of the arms do not contain any poly(vinyl aromatic) blocks. The copolymers of De Craene et al. '039 are not the same as the copolymers recited in our claims. The copolymers recited in our claims include arms containing S segments where "S is a nonelastomeric polymer segment endblock of a polymerized monovinyl aromatic homopolymer, there being at least two different molecular weight endblocks in said copolymer, a higher molecular weight endblock and a lower molecular weight endblock". Asymmetry arises because the copolymer includes arms containing different molecular weight polymerized monovinyl aromatic endblocks. De Craene et al. '039 does not anticipate our claims.

16. All statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the Application or any patent issuing thereon.

Further Declarant saith not.

01/28/2003
Date

Ashish Khandpur